

NOISE AND VIBRATION IMPACT CRITERIA

APPENDIX 3.4-C

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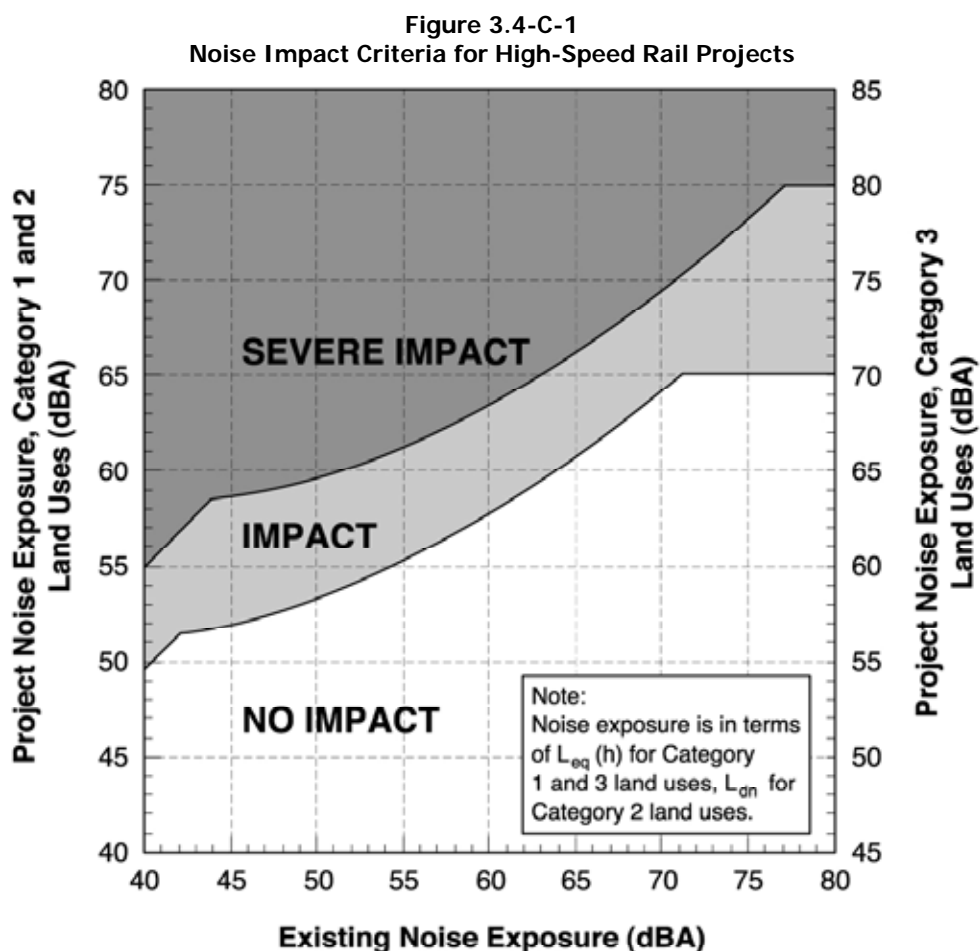
NOISE IMPACT CRITERIA

The Federal Railroad Administration's (FRA's) noise criteria are ambient-based, such that a rail project's noise is compared with existing conditions to provide an assessment of the effect of the potential change in noise environment on various land uses in the transportation corridor.¹ The assessment of project noise levels incorporates elements of both "relative" and "absolute" limits. Relative criteria are based on expected annoyance due to the change in the noise environment. Absolute criteria are based on activity interference such as interfering with speech (listening to radio or television) or arousing from sleep.

The figure used for noise impact assessment is the day-night sound level (L_{dn}) measured in decibels (dBA) for residential land uses, Land Use Category 2, including buildings where people sleep (residences, hospitals, hotels, motels). The hourly equivalent sound level (L_{eq}) in dBA is applied during hours of active use in parks (Land Use Category 1) and institutional uses (Land Use Category 3—churches, libraries, schools).

The FRA categorizes changes in noise over existing conditions in three levels of effect: *no impact*, *impact*, and *severe impact*. The noise levels for alternatives are compared to the existing ambient noise level prior to the introduction of the alternative. The intersection of the two levels on the graph in Figure 3.4-C-1 is an indicator of the degree of impact. Below the threshold of *impact*, the alternative would have *no impact* on noise since, on the average, there would be an insignificant increase in the number of people highly annoyed by the new noise from the alternative. For *severe impact*, a significant percentage of the people exposed to the noise would be highly annoyed by the new noise source. *Impact* is assessed when the noise level would be noticeable but would not be sufficient to cause strong, adverse reactions from the community. Upper limits are included in the FRA criteria to account for high noise levels judged to interfere with human activities.

¹ U.S. Department of Transportation, Federal Railroad Administration. "High Speed Ground Transportation Noise and Vibration Impact Assessment". Washington DC: 1998.



VIBRATION IMPACT CRITERIA

Table 3.4-C-1
Ground-Borne Vibration Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)	
	Frequent Events ¹	Infrequent Events ²
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 ³	65 ³
Category 2: Residences and buildings where people normally sleep	72	80
Category 3: Institutional land uses with primarily daytime use.	75	83

Notes:

VdB re 1 micro inch/sec = velocity level in decibel units re one micro-inch per second.

¹ Frequent events are defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

² Infrequent events is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

³ This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibrations levels. Ensuring lower vibration levels in a building often requires special design of the heating/air conditioning systems and stiffened floors.